WHAT IS CLAIMED IS:

1. A control apparatus which controls a torque of an engine coupled to an input shaft of an automatic transmission during a shift by that automatic transmission, comprising:

a controller which i) performs torque-down control by which the engine torque is decreased by a predetermined amount, ii) determines, during the torque-down control, a torque-restore control starting point at which time torque-restore control is to be started, and iii) starts the torque-restore control at the torque-restore control starting point so as to gradually restore the engine torque to a value before the torque-down control,

wherein the controller is adapted to determine the torque-restore control starting point according to a dynamic model which simulates the behavior of the automatic transmission over time from the start of the torque-down control, and so that a rotational speed of the input shaft of the automatic transmission at a target point substantially matches a target speed.

2. The control apparatus according to claim 1, wherein the dynamic model correlates the rotational speed of the input shaft of the automatic transmission at the target point with the time elapsed after the start of the torque-down control, and the controller is adapted to estimate the point at which the rotational speed of the input shaft of the automatic transmission at the end of the shift will likely substantially match the target speed if the torque-restore control were started at that point using the dynamic model, and make that point the torque-restore control starting point.

3. The control apparatus according to claim 3, wherein the controller repeatedly executes a process for estimating the rotational speed of the input shaft of the automatic transmission at the target point according to the dynamic model and based on the time from the start of the torque-down control at a predetermined frequency or at predetermined intervals from the start of the torque-down control until the rotational speed of the input shaft of the automatic transmission obtained by that process becomes equal to, or less than, the target speed.

4. The control apparatus according to claim 3, wherein the dynamic model includes a linear term for the time remaining until the target point and a term proportional to an integral value until the target point of at least one of an amount of change in the engine torque that will likely occur by the target point and an amount of change in a torque transmission capacity of a clutch inside the automatic transmission.

5. The control apparatus according to claim 2, wherein the dynamic model includes a linear term for the time remaining until the target point and a term proportional to an integral value until the target point of at least one of an amount of change in the engine torque that will likely occur by the target point and an amount of change in a torque transmission capacity of a clutch inside the automatic transmission.

6. A control method for controlling a torque of an engine coupled to an input shaft of an automatic transmission during a shift by that automatic transmission, comprising the following steps of:

performing torque-down control for reducing the engine torque by a predetermined amount,

determining, during that torque-down control, a torque-restore control starting point according to a dynamic model which simulates the behavior of the automatic transmission over time from the start of the torque-down control, and so that a rotational speed of the input shaft of the automatic transmission at a target time substantially matches a target speed, and

starting the torque-restore control at the torque-restore control starting point so as to gradually restore the engine torque to a value before the torque-down control was performed.

7. The control method according to claim 6, wherein the dynamic model correlates a rotational speed of the input shaft of the automatic transmission at the target point with the time elapsed after the start of the torque-down control, and the point at which the rotational speed of the input shaft of the automatic transmission at the end of the shift will likely substantially match the target speed if the torque-

restore control were started at that point is estimated using the dynamic model and made the torque-restore control starting point.

8. The control method according to claim 7, further comprising the step of:

repeatedly executing a process for estimating the rotational speed of the input shaft of the automatic transmission at the target point according to the dynamic model and based on the time from the start of the torque-down control at a predetermined frequency or at predetermined intervals from the start of the torque-down control until the rotational speed of the input shaft of the automatic transmission obtained by that process becomes equal to, or less than, the target speed.

9. The control method according to claim 8, wherein the dynamic model includes a linear term for the time remaining until the target point and a term proportional to an integral value until the target point of at least one of an amount of change in the engine torque that will likely occur by the target point and an amount of change in a torque transmission capacity of a clutch inside the automatic transmission.

10. The control method according to claim 7, wherein the dynamic model includes a linear term for the time remaining until the target point and a term proportional to an integral value until the target point of at least one of an amount of change in the engine torque that will likely occur by the target point and an amount of change in a torque transmission capacity of a clutch inside the automatic transmission.